APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/737,404	12/16/2003	Joakim Dahlstedt	BEAS-01298US1	7619

		EXAMINER
23910 7590 01/26/2007		WANG, RONGFA PHILIP
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SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/26/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

	Application No.	Applicant(s)
Office Action Summary	10/737,404	DAHLSTEDT ET AL.
	Examiner	Art Unit	
	Philip Wang	2191	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>16 December 2003</u>.

2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) <u>1-75</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) <u>1-75</u> is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☒ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on <u>16 December 2003</u> is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All   b) ☐ Some * c) ☐ None of:

      1. ☐ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____.

      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>9/27/2006</u>.

4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

Detail Action

1.   This office action is in response to the application filed on 12/16/2003.

2.   Claims 1-75 are pending.

Priority

3.   The priority date considered for this application is 12/20/2002.

Specification

4.   The specification is objected to as failing to provide proper antecedent basis for

the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction

of the following is required: On page 8 line 23, "hot objects" and "hot clusters" are

referenced without prior definitions.

Drawings

5.   The drawings are objected to because Figure 3 includes label "hot/cold objects"

where the examiner believes hot objects are not properly disclosed in the specification.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to

the Office action to avoid abandonment of the application. Any amended replacement

drawing sheet should include all of the figures appearing on the immediate prior version

of the sheet, even if only one figure is being amended. The figure or figure number of an

amended drawing should not be labeled as "amended." If a drawing figure is to be

canceled, the appropriate figure must be removed from the replacement sheet, and

where necessary, the remaining figures must be renumbered and appropriate changes

made to the brief description of the several views of the drawings for consistency.

Additional replacement sheets may be necessary to show the renumbering of the

remaining figures. Each drawing sheet submitted after the filing date of an application

must be labeled in the top margin as either "Replacement Sheet" or "New Sheet"

pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the

applicant will be notified and informed of any required corrective action in the next Office

action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6.   Claims 1-21 are rejected under 35 U.S.C. 112, first paragraph, as failing to

comply with the written description requirement. The claim(s) contains subject matter,

which was not described in the specification in such a way as to reasonably convey to

one skilled in the relevant art that the inventor(s), at the time the application was filed,

had possession of the claimed invention.

Claims 1, 8, and 15 recite the limitation of "determines the status of warm objects and cold objects". Though first paragraph of page 4, of the "Summary of the Invention" in the Specification mentions such limitation, however, the detailed description does not have any disclosure of such limitation. In order to traverse this rejection, the Applicant must show examples of "the status of warm objects and cold objects". To the best of the examiner's understanding, the terms "warm" or "cold" are used as status of an object. The specification does not appear to define status for either warm objects or cold objects.

Claims 2-7 depend on claim 1; claims 9-14 depend on claim 8; and claims 16-21 depend on claim 15, and suffer the same deficiency.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7.   Claims 6, 13, 20, 27, 34, 41 and 43-60, 64, 69, and 74 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 6, 13, 20, 27, 34, 41, 64, 69, and 74 recite the limitation "the limiting time" in "wherein the limiting time". There is insufficient antecedent basis for this limitation in the claim.

Per claims 43-60, the term "recently accessed" in claims 43, 49, and 55 is a relative term which renders the claim indefinite. The term "recently accessed" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. It is not clear how recent qualifies recently accesses. Claims 44-48 depend on claim 43; claims 50-54 depend on claim 49; and claims 56-60 depend on claim 55, and suffer the same deficiency.

8.   Claims 1-75 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01.

The claim language of claims 1, 8, 15, 22, 29, 36, 43, 49, 55, 61, 66, and 71 fails to include the steps of how warm/cold objects and/or links are determined. The language as presented does not qualify warm/cold objects as disclosed in the specification. For links, the claim language needs to further clarify how the links are established as disclosed in the disclosure, for example, page 8 and Figure 3, for links between warm/cold objects or clusters.

Claims 2-7 depend on claim 1; claims 9-14 depend on claim 8; and claims 16-21 depend on claim 15, and suffer the same deficiency.

Claims 23-28 depend on claim 22; claims 30-35 depend on claim 29; and claims 37-42 depend

on claim 36, and suffer the same deficiency.

Claims 44-48 depend on claim 43; claims 50-54 depend on claim 49; and claims 56-60 depend

on claim 55, and suffer the same deficiency.

Claims 62-65 depend on claim 61; claims 67-70 depend on claim 66; and claims 72-75 depend

on claim 71, and suffer the same deficiency.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –(a) the invention was known or used by others in this
> country, or patented or described in a printed publication in this or a foreign country, before the invention
> thereof by the applicant for a patent.

9.   Claims 22, 29, and 36 are rejected under 35 U.S.C. 102(a) as being anticipated

by Wolczko et al. (US Patent No. 6,728,738).

As per claims 22, 29, 36,

Wolczko et al. disclose

- a virtual machine executing within said run-time environment; a memory

    space within said run-time environment for storing objects in memory, for

use by a software application (c3: 16-23, "…Java Virtual

Machine…";);

- and, a temperature analyzer that determines the location of warm objects

and cold objects in memory, and the links between said warm and cold

objects, for use in detecting memory leaks (Fig. 2-4, shows

objects and links; since there is no explicit

definition of what warn/cold objects are, any object

in any of the graph can be either warm or cold

objects; c3:50-65, "…If a reference count equals

zero…" shows the system determines the status of an

object. The edges in Fig. 2-4 show links between

object; c4: 30-31, "…removing all objects listed as

dead…" such removal of objects shows the location of

objects are determined.).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10.   Claims 1-5, 7-12, 14-19, 21, 23-26, 28, 30-33, 35, 37-40, and 42 are rejected

under 35 U.S.C. 103(a) as being unpatentable over Wolczko et al. (US Patent No.

6,728,738) further in view of Arnold et al. (US Patent No. 6,795,836).

As per claims 1, 8, 15,

Wolczko et al. disclose

- an object temperature analyzer that determines the status of warm objects

    and cold objects in said memory, and the links between said warm and

    cold objects (Fig. 2-4, shows objects and links; since

    there is no explicit definition of what warn/cold

    objects are, any object in any of the graph can be

    either warm or cold objects; c3:50-65, "…If a

    reference count equals zero…" shows the system

    determines the status of an object. The edges in Fig.

    2-4 show links between object.);

Wolczko et al. do not specifically disclose

- and, a report mechanism that reports information about said links, for use

    in determining potential memory leaks.

However, Arnold et al. disclose

- and, a report mechanism that reports information about said links, for use

    in determining potential memory leaks (c3: 53-54, "…A visualizer

    program displays the trace data to the user…").

Therefore, it would have been obvious to a person of ordinary skill in the art at the time

the invention was made to incorporate the teachings of Arnold et al. into the teachings

of Wolczko et al. to include a report mechanism that reports information about said

links, for use in determining potential memory leaks. The modification would be obvious

to one of ordinary skill in the art to want to enable the user to make determination about

objects running on the system as suggested by Arnold et al. (c3: 56-57, "Allow

the user to determine...").

As per claims 2, 9, 16, 23, 30, 37,

-   Wolczko et al. disclose

    an object clusterer for clustering groups of warm objects to form warm

    clusters, and groups of cold objects to form cold clusters (Fig. 2-4,

    shows objects and links; since there is no explicit

    definition of what warn/cold objects are, any object

    in any of the graph can be either warm or cold

    objects; c3:50-65, "...If a reference count equals

    zero..." shows the system determines groups of objects.

    It can be interpreted that those objects with

    reference count equaling zero as cold and non-zero as

    warm.)

As per claims 3, 10, 17, 24, 31, 38,

Wolczko et al. disclose

- wherein the links includes any or both of warm object--cold object links

  and warm cluster--cold cluster links (FIG. 2-4; for example, link

  between 404 and 402 in Fig. 4)..

As per claims 4, 11, 18, 25, 32, 39,

Wolczko et al. disclose

- wherein the objects are used by the virtual machine (c3:16-18,

  "...Java Virtual Machine...").

As per claims 5, 12, 19, 26, 33, 40,

Arnold et al. disclose

- wherein the links can be displayed on a computer screen device (c3:

  53-54, "...A visualizer program displays the trace data

  to the user...").

As per claim 7, 14, 21, 28, 35, 42,

Arnold et al. disclose

- wherein the objects are not moved in memory when clustered (c3:50-

  65, "...If a reference count equals zero..." shows the

  system determines groups of objects. It can be

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interpreted that those objects with reference count

equaling zero as cold and non-zero as warm.  In this

step, only reference count is check, there is no

object movement.).
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11.   Claims 6, 13, 20, 27, 34, 41, and 43-75 are rejected under 35 U.S.C. 103(a) as

being unpatentable over Wolczko et al. (US Patent No. 6,728,738) in view of Arnold et

al. (US Patent No. 6,795,836), and further in view of Ryu et al. ("Garbage Collection for

Distributed Persistent Objects").

As per claims 6, 13, 20, 27, 34, 41,

  Wolczko et al./Arnold et al. do not specifically disclose

-    an adjustable limiting time.

  However, Ryu et al. disclose

-    the limiting time determining whether an object is warm or cold can be

adjusted by the developer to better distinguish between warm and cold

objects or warm and cold clusters (p. 3, 2nd para, "… assigns a

TTL (Time-To-Live).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time

the invention was made to incorporate the teachings of Ryu et al. into the teachings of

Wolczko et al./Arnold et al. to include an adjustable limiting time. The modification

would be obvious to one of ordinary skill in the art to want to perform garbage collection

in large scale distributed system as suggested by Ryu et al. (p. 2, 1st and 2nd para.).

As per claims 43, 49, 55,

Wolczko et al. disclose

- identifies links between objects (Fig. 2-4);

Wolczko et al. do not specifically disclose

- an object map

However, Arnold et al. disclose

- an object map (c3: 53-54, "...A visualizer program displays

    the trace data to the user...").

Therefore, it would have been obvious to a person of ordinary skill in the art at the time

the invention was made to incorporate the teachings of Arnold et al. into the teachings

of Wolczko et al. to include an object map. The modification would be obvious to one

of ordinary skill in the art to want to enable the user to make determination about

objects running on the system as suggested by Arnold et al. (c3: 56-57, "Allow

the user to determine...").

Wolczko et al./Arnold et al. do not specifically disclose

- an object temperature analyzer that determines the last access time of an

    object in memory;

- an object clusterer that clusters together objects according to last access

  • time;

- identifies links between objects that have been recently accessed, and

  other objects that have not been recently accessed, to assist in

  determining potential memory leaks.

However, Ryu et al. disclose

- an object temperature analyzer that determines the last access time of an

  object in memory (p. 3, Section, 3.2 for Last

  referenceable timestamp);

- an object clusterer that clusters together objects according to last access

  time (p. 3, Section 3.2, 2nd para., line 6-7, "Objects

  whose LRTSs are not more recent than a local threshold

  are local garbage...");

- identifies links between objects that have been recently accessed, and

  other objects that have not been recently accessed, to assist in

  determining potential memory leaks (p. 3, section 3.2; p. 4,

  1st para., "... before a local garbage object is

  reclaimed, all referencing objects are examined..." In

  order to access the referencing objects, the links

  between referencing objects and the object needs to be

  identified.).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time

the invention was made to incorporate the teachings of Ryu et al. into the teachings of

Wolczko et al./Arnold et al. to include an object temperature analyzer that determines

the last access time of an object in memory; an object clusterer that clusters together

objects according to last access time; and identifies links between objects that have

been recently accessed, and other objects that have not been recently accessed, to

assist in determining potential memory leaks. The modification would be obvious to one

of ordinary skill in the art to want to perform garbage collection in large scale distributed

system as suggested by Ryu et al. (p. 2, 1st and 2nd para.).

Per claims 44, 50, 56,

- See reason for rejection of claim 3.

Per claims 45, 51, 57,

- See reason for rejection of claim 4.

Per claims 46, 52, 58,

- See reason for rejection of claim 5.

Per claims 47, 53, 59,

- See reason for rejection of claim 6.

Per claims 48, 54, 60,

- See reason for rejection of claim 7.

As per claims 61, 66, 71,

Wolczko et al. disclose

- links between warm clusters and cold clusters (Fig. 2-4, objects

    in a cycle can be interpreted as a cluster).

Wolczko et al. do not specifically disclose

- a display device that displays an object map including links between warm

    clusters and cold clusters.

However, Arnold et al. disclose

- a display device that displays an object map including links between warm

    clusters and cold clusters. (c3: 53-54, "...A visualizer program

    displays the trace data to the user...").

Therefore, it would have been obvious to a person of ordinary skill in the art at the time

the invention was made to incorporate the teachings of Arnold et al. into the teachings

of Wolczko et al. to include a display device that displays an object map including links

between warm clusters and cold clusters.. The modification would be obvious to one of

ordinary skill in the art to want to enable the user to make determination about objects

running on the system as suggested by Arnold et al. (c3: 56-57, "Allow the

user to determine...").

Wolczko et al./Arnold et al. do not specifically disclose

- objects located in the memory of a run-time environment, wherein each

   object includes a time stamp field and a time stamp therein, and wherein

   the time stamp is updated with a current system time when the object is

   accessed or referenced;

- an object temperature analyzer that, after a time T_{check}, marks each object

   as being either warm or cold; an object clusterer that clusters warm

   objects together as warm clusters and cold objects together as cold

   clusters;

However, Ryu et al. disclose

- objects located in the memory of a run-time environment, wherein each

   object includes a time stamp field and a time stamp therein, and wherein

   the time stamp is updated with a current system time when the object is

   accessed or referenced (p. 3, Section, 3.2 for Last

   referenceable timestamp);

- an object temperature analyzer that, after a time T_{check}, marks each object

   as being either warm or cold; an object clusterer that clusters warm

   objects together as warm clusters and cold objects together as cold

   clusters (p. 3, Section 3.2, 2nd para., line 6-7,

   "Objects whose LRTSs are not more recent than a local

   threshold are local garbage...");

Therefore, it would have been obvious to a person of ordinary skill in the art at the time

the invention was made to incorporate the teachings of Ryu et al. into the teachings of

Wolczko et al./Arnold et al. to include objects located in the memory of a run-time environment, wherein each object includes a time stamp field and a time stamp therein, and wherein the time stamp is updated with a current system time when the object is accessed or referenced; an object temperature analyzer that, after a time T_{check}, marks each object as being either warm or cold; an object clusterer that clusters warm objects together as warm clusters and cold objects together as cold clusters. The modification would be obvious to one of ordinary skill in the art to want to perform garbage collection in large scale distributed system as suggested by Ryu et al. (p. 2, 1st and 2nd para.).

Per claims 62, 67, 72,

- See reason for rejection of claim 3.

Per claims 63, 68, 73,

- See reason for rejection of claim 4.

Per claims 64, 69, 74,

- See reason for rejection of claim 6.

Per claims 65, 70, 75,

- See reason for rejection of claim 7.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

It is noted that any citation [[s]] to specific, pages, columns, lines, or figures in the prior art references and any interpretation of the references should not be considered to be limiting in any way. A reference is relevant for all it contains and may be relied upon for all that it would have reasonably suggested to one having ordinary skill in the art. [[See, MPEP 2123]]

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Philip Wang whose telephone number is 571-272-5934. The examiner can normally be reached on Mon - Fri 8:00AM - 4:00PM. Any inquiry of general nature or relating to the status of this application should be directed to the TC2100 Group receptionist: 571-272-2100.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wei Zhen can be reached on 571-272-3708. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mary Steelman
Primary Examiner 1-22-07